PATENT SPECIFICATION

1,129,746

NO DRAWINGS.

1,129,746

Date of Application and filing Complete Specification:
17 June, 1966. No. 27263/66.

Application made in Austria (No. 5659) on 22 June, 1965.

Complete Specification Published: 9 Oct., 1968.

Index at Acceptance:—A2 D(2C, 2E1, 2L, 3A).

Int. Cl.:—A 23 I 3/00.

COMPLETE SPECIFICATION.

A Process for the Treatment of Liquids, More Particularly Preservation Thereof.

We, OSTERREICHISCHE STUDIENGESELLSCHAFT FUR ATOMENERGIE GES.m.b.H., an Austrian Body Corporate of 10, Lenaugasse, Vienna VIII, Austria, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a process for the treatment, more particularly preservation, of liquids of all kinds, especially beverages.

There are a number of existing processes for preserving beverages and/or increasing their storage life. Heat pasteurisation is a process widely used in the most diverse forms. In this process, the commodity is treated for a time, varying from a short to a long period dependent of the particular form of the process, at a temperature of 70°C or more. In addition, chemical preservatives, ultra-filtration techniques, sterile filling techniques and low-temperature refrigeration storage methods are employed.

Heat preservation has the advantage that it can be carried out on the already packaged commodity, but, on the other hand, it has the disadvantage that organoleptic changes (cooking flavour changes) generally occur in the beverage.

Chemical preservatives are generally peromitted by law only to a very limited extent and in many countries are prohibited altogether.

Other processes, such as, for example, ultra-filtration, require a sterile filling technique and are not only costly but also entail relatively high losses.

Low-temperature refrigeration storage has the advantage that the flavour is largely conserved, but, because of the costly equipment, is practicable only for limited quantities of special products.

The invention has for its object to provide a process of preserving goods packaged in an unsterile state, whilst avoiding the occurrence of organoleptic changes. The invention is based on the realization that known processes for the ionising irradiation of beverages with δ-radiation have hitherto generally resulted in preservation only when such a dose of radiation has been applied in itself to cause organoleptic changes in the beverage.

According to the invention, it is proposed that liquids of all kinds, especially beverages, to be treated, and in particular preserved, be irradiated with δ-radiation, and also be subjected to a physical, physico-chemical and/or chemical treatment.

The dosage of the δ-irradiation required for the preservation is substantially lower when this method of treatment is combined with another physical, physico-chemical and/or chemical method of treatment. The dose of radiation may be below one half of the minimum value which would be necessary with δ-radiation alone.

If, for example, a low dose of δ-radiation which, by itself alone, does not result in any preserving effect, is combined with slight heating which likewise does not possess any preserving action in itself, a storage product is obtained the organoleptic qualities of which are substantially better than those of a product which is preserved only by heat or only by radiation. Another advantage also lies in that this process can moreover be carried out on packaged goods.

Depending on the nature of the combination process, the physical, physico-chemical and/or chemical treatment is applied before,

during or after the irradiation treatment.

A number of Examples are given hereinafter.

EXAMPLE 1;

Combination of irradiation and heating:

If freshly pressed apple juice is heated to 50°C and is kept at this temperature for 40 minutes, it begins to ferment after about nine days when stored at room temperature. If freshly pressed apple juice is irradiated with Co 60 rays with a dose of 0.3 Mrad, it begins to ferment after about eight to ten days when stored at room temperature. If freshly pressed apple juice is now irradiated with this dose of the said δ-radiation and heated at the same time or immediately thereafter to 50°C and left at this temperature for ten minutes, no fermentation phenomena show themselves when the juice is stored at room temperature.

EXAMPLE 2;

Combination of irradiation and heating:

After a treatment, i.e. the action of heat at 50°C, over a period of 35 minutes, freshly pressed grape juice begins to ferment after six days. If freshly pressed grape juice is irradiated with a δ-radiation dose of 0.5 Mrad, it begins to ferment after about nine days. If grape juice is given a δ-radiation dose of 0.5 Mrad and is left for ten minutes at a temperature of 50°C, the grape juice can be stored without fermentation occurring.

EXAMPLE 3;

Combination of irradiation and chemical addition:

If vitamin K_5 in a proportional amount less than that normally required for preservation is added to the apple juice and it is given a δ-radiation dose of 0.3 Mrad, the apple juice can be stored.

Of course, the irradiation with δ-radiation may also be combined with other methods of treatment, for example utilising ultrasonics or chemical preservatives in amounts which are far below the amount that is usually required for preservation. Which form of ionising δ-radiation is used is of secondary importance.

It will be seen from the above Examples that the dose of radiation for preservation purposes, which with δ-radiation is normally 1 Mrad or more, can be reduced to below one half that value with the δ-radiation used in the process according to the invention.

We are aware of The Food (Control of Irradiation) Regulation 1967 and in so far as our invention relates to the treatment of liquids for human consumption to be sold in England and Wales, we make no claim to use of the invention in contravention of the law.

Subject to the foregoing disclaimer, WHAT WE CLAIM IS:—

1. A process for the treatment, particularly preservation, of liquids of all kinds, especially beverages, wherein the liquid is irradiated with ionising δ-radiation and is also subjected to a physical, physico-chemical and/or chemical treatment.

2. A process according to claim 1, characterised in that the liquid is heated during and/or after the irradiation treatment.

3. A process according to claims 1 and 2, characterised in that the irradiated liquid is kept at a predetermined temperature for a predetermined time.

4. A process according to any one of the preceding claims, characterised in that for the purpose of chemical treatment, a chemical substance, for example a preservative or a vitamin such as vitamin K_5, is added to the liquid in an amount less than that normally required for the purpose of preservation of said liquid.

5. A process according to any one of the preceding claims, characterised in that the dose of δ-radiation is below one half of that which would be required to sterilize a liquid when using δ-radiation alone.

6. A process for the treatment, particularly preservation, of liquids of all kinds, especially beverages, substantially as herein described with reference to Example 1 or Example 2 or Example 3.

ARTHUR R. DAVIES,
Chartered Patent Agent,
27, Imperial Square,
Cheltenham,
and
115, High Holborn,
London, W.C.1,
Agent for the Applicants.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1968.
Published at The Patent Office, 25 Southampton Buildings, London, W.C.2,
from which copies may be obtained.